

Amendments to the Claims:

Please amend the claims as shown. Applicants reserve the right to pursue any cancelled claims at a later date.

1.-29. (canceled)

30. (new) A method for combining a plurality of incoming optical time-division multiplex signals to form a resulting time-division multiplex signal, the incoming signals and the resulting signal each have a maximum number of periodic time-division multiplexed channels, the method comprising:

identifying an occupancy of the channels for the incoming signals, the occupancy including a commonly occupied channel of the incoming signals and a commonly unoccupied channel of the incoming signals;

identifying a time correspondence of the identified occupancy; and

reassigning of a content of an occupied channel to an unoccupied channel via a reciprocal time displacement of the content,

whereby the content of the incoming signals are reordered and combined to form the resulting signal such that the combining is collision-free.

31. (new) The method as claimed in claim 30, wherein by using the time correspondence of the occupied channel, the content of the occupied channel is branched from one of the incoming signals and temporally displaced until it corresponds temporally to the unoccupied channel.

32. (new) The method as claimed in claim 30, wherein after the time displacement of a branched content, the branched content is inserted into one channel of the incoming signals and the incoming signals are optically coupled.

33. (new) The method as claimed in claim 30,
wherein the plurality of incoming signals includes a first incoming signal and second incoming signal, and

wherein the sum of a count of occupied channels of the first incoming signal and a count of occupied channels of the second incoming signal does not exceed the maximum number channels of the resulting signal.

34. (new) The method as claimed in claim 30,

further providing a total number of time-division multiplexed channels, the total number being a multiple of four, and

wherein a number of branches or a number of reinsertion is at least the total number divided by four and a number of time displacements is one more than quotient of the total number divided by four.

35. (new) The method as claimed in claim 30, wherein if a total count of occupied channels of the incoming signals exceeds the number of channels of the resulting signal, the occupied channel of one of the signals is diverted and combined to form a further time-division multiplex signal.

36. (new) The method as claimed in claim 35, wherein during diversion of the occupied channel a granularity characteristic is modified such that the diverted channel and the further signal are combined with the same granularity characteristics.

37. (new) The method as claimed in claim 35, wherein wavelength is selected as the modified granularity.

38. (new) The method as claimed in claim 35, wherein wavelength an identical number of branches, time displacements, reinsertions and optionally diversions is used for each incoming signal.

39. (new) The method as claimed in claim 31, wherein for occupied and unoccupied channels the occupancy of channels of the incoming signals is identified before a channel is branched.

40. (new) The method as claimed in claim 39, further comprises identifying a further occupancy of the channels before a further channel branching.

41. (new) The method as claimed in claim 39, wherein the occupancy is identified from information from a network manager.

42. (new) The method as claimed in claim 39, wherein the occupancy is identified from an extracted light element of one of the incoming signals being overlaid optically with a control pulse synchronized with the signal and the overlaid signal is output to an avalanche photodiode or a non-linear detection element that provides an output signal having information about the occupancy of a channel.

43. (new) The method as claimed in claim 42, wherein a bit rate of the control pulse is tailored to a bit rate of the signals and the control pulse is gradually subjected to a time delay.

44. (new) The method as claimed in claim 39, wherein occupancy is identified by demultiplexing the incoming signals having a bandwidth at least half the bandwidth of the signals.

45. (new) The method as claimed in claim 31, wherein phases of the incoming signals are synchronized before the first branching of a content of their channels.

46. (new) The method as claimed in claim 31, wherein a clock pulse of the branch and a time delay are regulated.

47. (new) The method as claimed in claim 30, wherein during the combining of incoming signals a clock pulse synchronization is regulated.

48. (new) An arrangement for combining a plurality of incoming optical time-division multiplex signals to form a resulting time-division multiplex signal, each signal having the same maximum number of periodic time-division multiplexed channels, the arrangement comprising:

a controller;

a detection unit identifying an occupancy of channels and channel time correspondence of the incoming signals, the detection unit operatively connected to the controller via a control signal, the occupancy including a commonly occupied channel of the incoming signals and a commonly unoccupied channel of the incoming signals;

a time delay element for the reciprocal time displacement of a content from the occupied channel in one of the incoming signals, the time delay element operatively connected to the controller; and

an optical coupler connected downstream from the time delay element to reassign the content to the unoccupied channel of the incoming signals,

wherein combining into the resulting signal occurs in a collision-free manner.

49. (new) The arrangement as claimed in claim 48,

further comprises a drop module operative connected to the time delay element and to the controller, the controller activates the branching and sets a time delay,

wherein the incoming signals have a plurality of occupied and a plurality of unoccupied channels, and

wherein to branch a content of one of the occupied channels one of the plurality of incoming signals is fed into the drop module.

50. (new) The arrangement as claimed in claim 48, further comprising a network manager connected to the controller via a control signal, wherein the network manager identifies the occupancy of channels with time correspondence between or during incoming signals.

51. (new) The arrangement as claimed in claim 48, further comprising:

a drop module having an input and output;

and a further time delay element operatively connected to the output of the drop module, wherein one of the signals is fed to an input of the drop module.

52. (new) The arrangement as claimed in claim 51,

further comprises an insertion facility connected downstream from the further time delay element for reinsertion of a branched and time-delayed content of a channel into the original signal,

wherein the optical coupler is connected downstream from the insertion facilities.

53. (new) The arrangement as claimed in claim 48, wherein the controller has a counter for the occupied and unoccupied channels.

54. (new) The arrangement as claimed in claim 48, wherein the controller has a unit to assign the occupied channel to the unoccupied channels.

55. (new) The arrangement as claimed in claim 49, wherein if there is a collision risk in respect of the content a drop module is connected upstream from the add-drop module.

56. (new) The arrangement as claimed in claim 55, further comprises a wavelength converter or switch operatively connected to the output of the drop module such that a new wavelength is allocated to the channels of content with collision potential.

57. (new) The arrangement as claimed in claim 56, wherein the channels with the new wavelength are an input signal fed into a further connected arrangement, the further arrangement combining a plurality of input signals to form a next resulting time-division multiplex signal, each signal having the same maximum number of periodic time-division multiplexed channels, the plurality of input signals includes the channels with the new wavelength, the further arrangement comprising:

a controller;

a detection unit identifying an occupancy of channels and channel time correspondence of the incoming signals, the detection unit operatively connected to the controller via a control signal, the occupancy including a commonly occupied channel of the incoming signals and a commonly unoccupied channel of the incoming signals;

a time delay element for the reciprocal time displacement of a content from the occupied channel in one of the incoming signals, the time delay element operatively connected to the controller;

an optical coupler connected downstream from the time delay element to reassign the content to the unoccupied channel of the incoming signals; and

a drop module operative connected to the time delay element and to the controller, the controller activates the branching and sets a time delay,

wherein the incoming signals have a plurality of occupied and a plurality of unoccupied channels,

wherein to branch a content of one of the occupied channels one of the plurality of incoming signals is fed into the drop module, and

wherein combining into the resulting signal occurs in a collision-free manner.